

REMARKS/ARGUMENTS

Claims 1-12, 23, and 25-31 are active. Claims 13-22 have been withdrawn from consideration. A typographical error in claim 25 has been corrected. New claims 28-29 find support in the original claims. Support for this claim is found in original claim 1 and in the disclosure, e.g., at page 5, line 22. New claims 30-31 find support in the original claims and disclosure at page 20, line 19 which discloses polyoxyethylene hydrogenated castor oil. No new matter has been added. Favorable consideration of this response and allowance of the case are now respectfully requested.

Restriction/Election

The Applicants previously elected with without traverse **Group I**, claims 1-12, directed to a composition comprising a sulfonylurea and an alkoxylated glyceride. The Applicants respectfully request that the claims directed to any non-elected subject matter which depend from or otherwise include all the limitations of an allowed elected claim, be rejoined and allowed upon an indication of allowability for the elected claim, see MPEP 821.04.

Rejection—35 U.S.C. §103(a)

Claims 1-12, 23, 25 and 27 were rejected under 35 U.S.C. §103(a) as being unpatentable over Maeda, et al., U.S. Patent No. 5,830,827, in view of Anderson, et al., *Alkoxylated Glyceride Emulsifiers in Agricultural Applications*.

Maeda is specifically directed to flazasulfuron, see *Abstract* and *Field of Invention* in col. 1 as a herbicidal sulfonylurea compound which is disclosed as lacking storage stability (col. 1, lines 49-51). Maeda describes various classes of herbicides, including flazasulfuron and other kinds of sulfonylurea compounds, in cols. 3-4, see e.g., col. 3, lines 19-26.

However, both Test Example 1 and Test Example 2 of Maeda involve flazasulfuron (Compound A) as do Formulation Examples 1-19 in cols. 7-9 of Maeda. Maeda does not exemplify a composition containing a non-flazasulfuron compound, nor does it exemplify the combination of a sulfonylurea herbicide and an alkoxylated glyceride.

Anderson is relied upon as teaching ethoxylated glycerides as safe and effective nonionic emulsifiers (OA, middle of page 4) since Maeda does not disclose this element of the invention. On the other hand, Anderson does not suggest or exemplify admixing an ethoxylated glyceride with the flazasulfuron of Maeda but is directed to admixtures of the herbicides trifluralin (p. 141, Table 5) or 2,4-D iso octyl (pp. 142-143, Tables 8-9). Neither Maeda, nor Anderson specifically suggests the combination of a sulfonylurea, like flazasulfuron, with ethoxylated glycerides. One of ordinary skill in the art at the time of invention would not have had a reasonable expectation of success for combining the teachings of Maeda and Anderson for the following reasons.

To rely on a reference, it must be analogous art, MPEP 2141.01. To determine whether a reference is analogous art the Examiner must consider differences in structure and function. However, in the present situation the flazasulfuron of Maeda and the two herbicides, trifluralin and 2,4-D iso octyl, of Anderson have different structures and different functions. Their functional differences arise from significant divergences in their aqueous solubilities. According to the *Pesticide Manual*, 13<sup>th</sup> edition (2003, excerpts attached) the aqueous solubility of flazasulfuron is 2.1 g/L (pH 7 at 25°C) while it is 0.395 mg/L for trifluralin and 10 mg/L for 2,4-D iso octyl. These differences in aqueous solubility are significant since those of ordinary skill in the art recognized that it is more difficult to get a relatively hydrophilic sulfonylurea compound like flazasulfuron to pass through the wax layer cover a plant leaf to deliver the active herbicide into the plant than for the other two herbicides. Thus, Anderson cannot provide a reasonable expectation of success that

emulsification procedures used for trifluralin and 2,4-D isooctyl would have produced a useful or stable flazasulfuron emulsion due to these differences in solubility. In this respect, Anderson is non-analogous art to Maeda's teaching of flazasulfuron due to both structural and functional differences in the compounds it describes.

Besides the nonionic surfactants of Anderson, Maeda also discloses a broad class of surfactants that might be combined with a herbicide, col. 2, lines 37-60. Col. 2, line 58 describes "polyoxyethylene glycerin fatty acid ester" a type of non-ionic surfactant. However, col. 2 does not single out alkoxylated glyceride surfactants since it discloses a large number other surfactants including anionic surfactants (lines 37-50) and numerous kinds of non-ionic surfactants (lines 51-60). Maeda does not exemplify a composition containing an alkoxylated glyceride, nor does it exemplify the combination of a sulfonylurea herbicide and an alkoxylated glyceride. Therefore, the situation described by MPEP 2131.02 excerpted below does not apply because the prior art discloses no species falling within the claimed genus.

A generic claim cannot be allowed to an applicant if the prior art discloses a species falling within the claimed genus." The species in that case will anticipate the genus. *In re Slayter*, 276 F.2d 408, 411, 125 USPQ 345, 347 (CCPA 1960); *In re Gosteli*, 872 F.2d 1008, 10 USPQ2d 1614 (Fed. Cir. 1989); MPEP 2131.02.

Maeda does not suggest the combination of a sulfonylurea herbicide and an alkoxylated glyceride. The Examiner has established no specific motivation for selecting a sulfonylurea and an alkoxylated glyceride. However, as held by *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991), that the references themselves or the knowledge in the art must provide some suggestion or motivation to arrive at the invention. Further, as held by the U.S. Supreme Court: "*there must be some articulated reasoning* with some rational underpinning to support the legal conclusion of obviousness." *KSR Int'l v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (emphasis added)). The

suggestion or motivation required by *Vaeck* and the articulated reasoning required by *KSR* are absent here.

Assuming *arguendo* that the Examiner has established general motivation in the prior art for admixing different types of herbicides with different types of surfactants, at best, Maeda provides only generic motivation for a combination of flazasulfuron, another herbicide besides flazasulfuron--possibly but not necessarily another sulfonylurea, and an excipient--possibly but not necessarily an alkoxylated glyceride.

To establish a *prima facie* case for obviousness when the prior art teaches a genus, but the claims are directed to a species or a subgenus, MPEP 2144.08 sets for the following factors:

1. Determine the Scope and Content of the Prior Art. In the present situation the Examiner relies on Maeda as generically disclosing a genus of herbicides, including sulfonylurea herbicides, and relies on Maeda and Anderson as teaching a genus of excipients, including different kinds of surfactants including alkoxylated glycerides. In the case of a prior art reference disclosing a genus the Examiner is directed to make findings as to:

(A) the structure of the disclosed prior art genus and that of any expressly described species or subgenus within the genus;

(B) any physical or chemical properties and utilities disclosed for the genus, as well as any suggested limitations on the usefulness of the genus, and any problems alleged to be addressed by the genus;

(C) the predictability of the technology; and

(D) the number of species encompassed by the genus taking into consideration all of the variables possible.

The paragraph bridging pages 3-4 of the OA address this scope of the prior art, but fails to make any of these finds. Rather with the benefit of hindsight it points out that Maeda discloses one type of a sulfonylurea herbicide (flazasulfuron) without pointing out the size of the huge genus of herbicides Maeda discloses and singles out "nonionic surfactants such as

polyoxyethylene glycerin" again without addressing the large size of the genus of excipients disclosed by Maeda. The OA does not adequately address points (B), (C) and (D).

Particularly, with regard to (D) the Examiner has not considered the huge number of different permutations of herbicides and excipients encompassed by Maeda.

2. Ascertain the Differences Between the Closest Disclosed Prior Art Species or Subgenus of Record and the Claimed Species or Subgenus. The Examiner discusses this point at the top of page 4 of the OA and acknowledges that Maeda does not "disclose a specific example comprising a surfactant selected from polyoxyethylene glycerin fatty acid ester, fatty acid polyglyceride and polyoxyethylene hydrogenated castor oil." Anderson is cited at this point to establish that ethoxylated glycerides "have long been known as effective and safe nonionic emulsifiers". However, this section of the OA does not explain whether the Examiner considers Maeda or Anderson as the closest prior art to the invention which involves a combination of a herbicidal sulfonylurea and an alkoxyolated glyceride. Presumably, Maeda would be considered the closest prior art because it is the only reference relied upon as describing a sulfonylurea herbicide. MPEP 2144.08 (A)(2) indicates that "the closest disclosed species or subgenus in the prior art reference should be identified and compared to that claimed". However, the OA does not say what the closest prior art species or subgenus in Maeda would be. Since Maeda does not exemplify species containing an alkoxyolated glyceride and does not describe a subgenus of compositions containing both a sulfonylurea herbicide and an alkoxyolated glyceride, the Applicants respectfully submit that there is no closest prior art species or subgenus in Maeda only the broad genus of possible permutations of different herbicides and excipients described by Maeda or only species of compositions containing flazasulfuron, but not an alkoxyolated glyceride.

3. Determine the Level of Skill in the Art. The OA does not address the ordinary level of skill in the art at the time of invention. MPEP 2144.08 indicates that the Examiner

should address this point to maintain objectivity in the obviousness inquiry and that obviousness must be “viewed from position of ordinary skill, not of an expert”. In the present case, the Examiner has not addressed the ordinary level of skill in the art and thus has failed to establish this element of the *prima facie* case.

4. Determine Whether One of Ordinary Skill in the Art Would Have Been Motivated

To Select the Claimed Species or Subgenus. At bottom of page 4 of the OA in the statement of the *prima facie* case the Examiner indicates “One would have been motivated to include these surfactants because Maeda teaches that these surfactants contribute to the improvement of the physical properties of the formulation and Anderson et al. specifies selected ethoxylate glyceride because they are favorable for human and ecotoxicological profiles” and because the U.S. EPA requires the selection of castor oil (based) excipients on growing crops.

The Examiner asserts that the motivation to admix any herbicide with an alkoxylated glyceride is that the EPA only permits herbicides to be admixed with Castor Oil (ethoxylated), but not with other types of surfactants. Anderson (2001) indicates:

Current United States Environmental Protection Agency regulations restrict the choices available to agricultural formulators to a single triglyceride, castor oil, with between 5 and 54 moles of ethoxylation.

However, the Examiner has not established what regulatory rules were in effect at the time of invention (or even which “current” EPA regulations that Anderson is referencing) and has not established that one of ordinary skill in the art had sufficient regulatory and legal background to understand these rules and other provisions regarding acceptable usages in the United States of nonionic surfactants. Moreover, Anderson itself indicates that “some companies” may have been granted exceptions to these rules, thus the rule, even if in existence at the time of invention, do not appear to be one that is invariably applied. Clearly,

EPA rules regarding surfactants have not been established as being accessible and well-known to those of ordinary skill in the art at the time of invention.

Furthermore, the citation in Anderson specifically refers to “agricultural formulators” and the Examiner has not established that it would in apply to non-agricultural usages of other surfactants. Consequently, the Examiner has not established that one of ordinary skill in the art at the time of invention would have been motivated to use only ethoxylated castor oil.

No other motivation to make the combination of the invention. Any potential motivation to select an alkoxylated glyceride based on EPA regulations aside, the Examiner has not pointed out any other suggestion in the prior art for the combination of the invention. Maeda relates to flazasulfuron and Anderson relates to emulsification of trifluralin and 2,4-D iso octyl and does not disclose a sulfonylurea (SU) compound. These references disclose entirely different compounds than those of the invention. In view of these differences, the prior art cannot suggest the specific combination of the invention. The first prong of the test in *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991), that the references themselves or the knowledge in the art must provide some suggestion or motivation to arrive at the invention has not been met and the “articulated reasoning” required by *KSR Int'l v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007) is absent. The Examiner previously cited to the *KSR* decision to say that Maeda discloses a finite number of identified predictable solutions and thus provides a reasonable expectation of success for the combination of a sulfonylurea herbicide and an alkoxylated glyceride. However, the Applicants have already demonstrated that Maeda does not offer predictable solutions or any reasonable expectation of success for the invention. This is because Maeda encompasses ***numerous combinations*** that are not effective and do not produce the enhanced herbicidal effects shown for the combination of the invention.

No reasonable expectation of success. Furthermore, the prior art cannot provide a reasonable expectation of success for the functional properties of the invention as discovered by the inventors. The experimental data of record show that a representative number different sulfonylurea herbicides had significantly increased herbicidal activity when admixed with numerous different alkoxylated glycerides, but much less activity when admixed with other non-ionic surfactants (e.g., *Citowett* or *Tween-20*); or cationic surfactants (e.g., *Frigate*). Maeda fails to provide a reasonable expectation of success for the enhanced herbicidal properties of such a selection.

The Applicants' prior arguments regarding the suggestion to selectively combine these two components, including their extensive experimental data have still not been addressed or rebutted. While Anderson is relied upon for teaching alkoxylated glycerides (specifically, ethoxylated glycerides) "as effective and safe emulsifiers" (OA, page 4, lines 9-10), it does not suggest selectively combining these with a herbicidal sulfonylurea, nor provide a reasonable expectation of success for the enhanced herbicidal properties achieved by this selection as opposed to selection of some other surfactant. Anderson teaches away from the equivalence of different surfactants at several points.

First, Anderson states on page 136 that "No other ethoxylated or alkoxylated glycerides are specifically approved. . ." by EPA regulations. One of ordinary skill in the art at the time of invention would not have had a reasonable expectation of success in substituting non-castor oil based alkoxylated glycerides for other types of alkoxylated glycerides based on this teaching.

Second, Anderson expressly refers to "the *unique* qualities castor-based surfactants possess" due to compositional differences with other surfactants. Based on this teaching one of ordinary skill in the art at the time of invention would not have recognized the equivalence

of different alkoxylated glycerides for various agricultural applications discussed by Anderson.

Lastly, the Anderson results show that different alkoxylated glycerides had different emulsion stabilities with various (non-sulfonylurea) herbicides, see e.g., Tables 8 and 9 showing that some combinations produced very good or good emulsions, while others did not. Based on these divergent results one of ordinary skill in the art at the time of invention would not have had a reasonable expectation of success that alkoxylated glycerides would have enhanced herbicidal properties of a sulfonylurea herbicide. The comparative data of record are reiterated below:

(A) Comparative surfactants. The specification shows the superior herbicidal properties of the invention when an alkoxylated glyceride is selected in comparison to combinations containing *Citowett* and *Frigate* herbicide surfactants. Maeda, col. 2, line 55 discloses *Citowett* which corresponds to “polyethylene alkylaryl ether”, but is silent about whether to select an inferior<sup>1</sup> surfactant like *Citowett* or an alkoxylated glyceride required by the invention.

Maeda, col. 2, lines 57-58, discloses “polyoxyethylene sorbitan fatty acid ester” which corresponds to the comparative surfactant Tween 20 (polyoxyethylene sorbitan monolaurate) described in Test Example 2 of the present application. As shown in Table 2 on page 49 of the specification the use of *Tween 20* in combination with a sulfonylurea herbicide produced significantly inferior herbicidal effects compared to combinations containing each of the eight different alkoxylated glycerides tested.

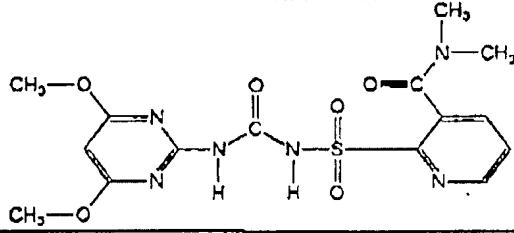
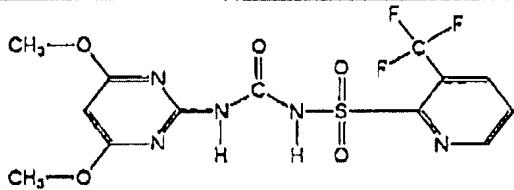
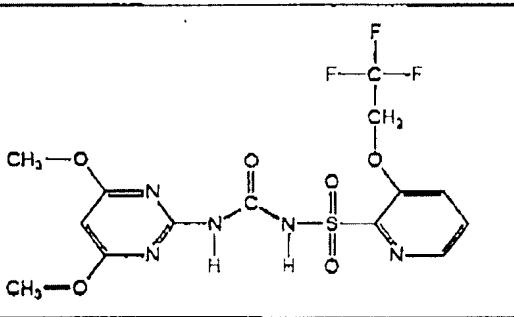
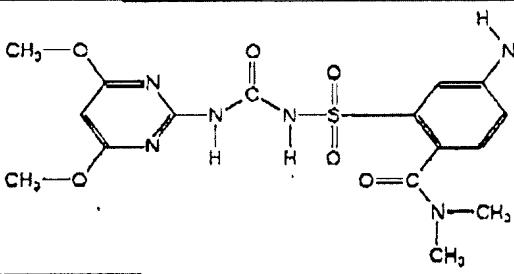
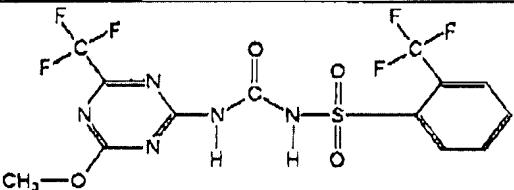
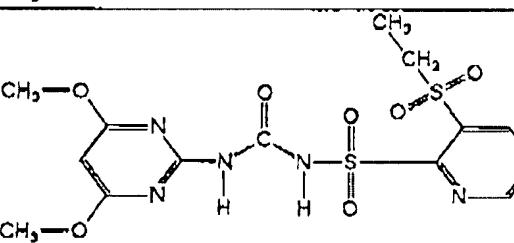
Sulfonylurea herbicide combinations including *Frigate*, a cationic surfactant, were also compared to combinations containing alkoxylated glyceride surfactant.

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<sup>1</sup> See the inferior herbicidal properties of combinations using *Citowett* in Table 3 (page 50), Table 4 (page 52), Table 5 (page 53)Table 6 (page 54), etc.

*Frigate* represents conventional art in comparison to alkoxylated glycerides used by the invention as discussed in the *Background Art* section of the present specification.

(B) The superior herbicidal effect is not limited to a single species of sulfonylurea herbicide. The Examples in the specification show that the superior herbicidal effects are obtained for a number of chemically different types of sulfonylurea herbicides and thus provide a representative number of species to support the claimed genus of sulfonylurea herbicides. The table below depicts six different sulfonylurea's (nicosulfuron, flazasulfuron, trifluoxysulfuron, foramsulfuron, tritosulfuron and rimsulfuron) used in Examples of the present application. These structures are reasonably representative of the genus of sulfonylurea herbicides and they take into account the variation of chemical structures within this class of herbicides including species representing both the pyridine- and benzene-types of sulfonylurea herbicides (see the ring structures on the right). Accordingly, the Applicants have shown that the Examples in the specification adequately and reasonably represent the genus of sulfonylurea herbicides described by the present claims.

<i>Nicosulfuron</i>	 Chemical structure of Nicosulfuron: A 2-methoxy-4-methylimidazole ring is fused to a pyrimidine ring. The pyrimidine ring is substituted with an amide group (-CONHNHCO-) and a sulfonamide group (-S(=O)(=O)C6H4N). The amide group is further substituted with a 2-methyl-1-(methylamino)ethyl group.
<i>flazasulfuron</i>	 Chemical structure of Flazasulfuron: A 2-methoxy-4-methylimidazole ring is fused to a pyrimidine ring. The pyrimidine ring is substituted with an amide group (-CONHNHCO-) and a sulfonamide group (-S(=O)(=O)C6H4N). The amide group is further substituted with a 2-(difluoromethyl)ethyl group.
<i>trifloxsulfuron</i>	 Chemical structure of Trifloxsulfuron: A 2-methoxy-4-methylimidazole ring is fused to a pyrimidine ring. The pyrimidine ring is substituted with an amide group (-CONHNHCO-) and a sulfonamide group (-S(=O)(=O)C6H4N). The amide group is further substituted with a 2-(trifluoromethyl)ethyl group.
<i>foramsulfuron</i>	 Chemical structure of Foramsulfuron: A 2-methoxy-4-methylimidazole ring is fused to a pyrimidine ring. The pyrimidine ring is substituted with an amide group (-CONHNHCO-) and a sulfonamide group (-S(=O)(=O)C6H4N). The amide group is further substituted with a 2-(methylamino)cyclohexyl group.
<i>tritosulfuron</i>	 Chemical structure of Tritosulfuron: A 2-methoxy-4-methylimidazole ring is fused to a pyrimidine ring. The pyrimidine ring is substituted with an amide group (-CONHNHCO-) and a sulfonamide group (-S(=O)(=O)C6H4N). The amide group is further substituted with a 2-(difluoromethyl)cyclohexyl group.
<i>rimsulfuron</i>	 Chemical structure of Rimsulfuron: A 2-methoxy-4-methylimidazole ring is fused to a pyrimidine ring. The pyrimidine ring is substituted with an amide group (-CONHNHCO-) and a sulfonamide group (-S(=O)(=O)C6H4N). The amide group is further substituted with a 2-(methylsulfonyl)ethyl group.

(C) The superior herbicidal effect is not limited to single species of alkoxylated glycerides. The superior herbicidal properties of the invention are also supported by results

showing that a representative number of different alkoxylated glycerides in combination with a sulfonylurea herbicide provide superior herbicidal properties. For example, Table 1 on page 47 shows the superior properties of combinations including eight different types of alkoxylated glycerides and a sulfonylurea herbicide. Tables 2 and 3 also provide similar comparisons. In order to improve the herbicidal effects of sulfonylurea, a herbicidal active ingredient has to pass through a wax layer in plant leaves to penetrate into the interior of the leaves. A sulfonylurea is hydrophilic and has relatively high solubility in water and hardly passes through the more hydrophobic wax layer. The inventors have found that selection of an alkoxylated glyceride allows a sulfonylurea to penetrate the wax layer on leaves and exhibit a herbicidal effect inside the leaf. Not all surfactants provide this property.

In the present invention, a surfactant having a structure wherein a fatty acid and glycerol which are similar to vegetable oils and have compatibility with a wax layer are bonded to a hydrophilic polyoxyalkylene is combined with sulfonylurea, whereby the herbicide effect of sulfonylurea can be remarkably improved.

This feature and advantage of the invention is neither described nor suggested by Maeda or by Anderson which cannot suggest selection of this class of surfactants, nor provide a reasonable expectation of success for this property of alkoxylated glycerides in combination with a sulfonylurea herbicide.

Claims 28-30. In addition to the reasons given in the remarks above, claims 28-30 are not subject to this rejection for the following reasons. Maeda is directed to a herbicidal composition containing flazasulfuron which Maeda characterizes as having stability problems, col. 1, lines 49-51. Maeda is directed to identifying a formulation which stabilizes this particular herbicide. Claims 28-30 require herbicides other than flazasulfuron. While it is true that cols. 3-4 of Maeda describe other types of herbicides which can be blended with flazasulfuron, it does not disclose or contemplate a mixture not containing flazasulfuron or a

non-flazasulfuron containing mixture which includes an alkoxylated glyceride. Anderson is directed to alkoxylated glyceride emulsifiers in agricultural applications (see Title) and does not disclose sulfonylurea herbicides required by these claims either. Consequently, claims 28-30 are not subject to this rejection since the prior art does not disclose or suggest all the elements required by these claims.

For all of the reasons above, this ground of rejection cannot be sustained.

Rejection—35 U.S.C. §103(a)

Claim 26 was rejected under 35 U.S.C. §103(a) as being unpatentable over Maeda, et al., U.S. Patent No. 5,830,827. This rejection also cannot be sustained for the reasons stated above. Maeda did not suggest selecting the specific combination of one of the alkoxylated glycerides and one of the sulfonylurea herbicides required by this, nor did it provide a reasonable expectation of success for the superior herbicidal effects of such a combination. The experimental data of record demonstrate the superior herbicidal effects achieved by such a selection compared to selection of other surfactants, including other non-ionic surfactants. Consequently, this rejection cannot be sustained.

Conclusion

In view of the amendments and remarks above, the Applicants respectfully submit that this application is now in condition for allowance. An early notice to that effect is earnestly solicited.

Respectfully submitted,

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